Remarks and Arguments

Claims 1 and 3-5 are pending in this application. Claims 1 and 3-5 stand finally rejected. With this amendment claim 1 is amended.

With this amendment, a Request for Continued Examination is filed concurrently.

As a result of this Amendment and the following discussion, the applicants believe that all of the claims now remaining in the application – in their present form – are allowable.

If however, the Examiner believes that there are any unresolved issues requiring adverse action in any of the claims now pending in the application, it is requested that the Examiner telephone Jeffery J. Brosmer, Ph.D., ESQ. At 732-335-5773, so that arrangements may be made for resolving such issues as expeditiously as possible.

Claim Rejections 35 U.S.C. § 102(b)

Claims 1, and 3 - 5 are rejected under the provisions of 35 U.S.C. § 102(b) as being anticipated by Li et al., in an article entitled "Support Vector Regression and Classification Based On Multi-View Face Detection and Recognition", which was presented at FG2000.

In response, the applicants have now amended claim 1. In view of these amendments and the following discussions, the applicants submit that all of the claims now present in the application are not anticipated by the Li et al reference.

To determine facial pose, the present applicants have developed a sparse representation of a human face, which advantageously captures unique features of the human face effectively, while facilitating the estimation of head position and pose. More particularly, the sparse representation is collection of projections to a number of randomly generated possible configurations of the human face. Each projection corresponds to a pose of the head along with facial features' configuration, and advantageously responds to changes in pose and feature configuration while ignoring other image variations such as lighting, hair and background.

Turning now to the Li et al reference, there it is disclosed a face detection and recognition framework employing the use of a generic pre-processing (Sobel filter & PCA) for gradient features to estimate facial pose. Despite the Examiner's suggestion that Li et al employs the use of a "sparse representation", there is nothing "sparse" at all about using Sobel filters and PCA. Sobel operators merely ENHANCE the gradient features while PCA reduces redundancy (dimensionality).

As the examiner can surely appreciate, there is simply no teaching or suggestion of the use of sparse representations in the Li et al publication, and certainly no sparse representation generated by transforming a raw facial image into sets of vectors representing fits of the face to a random, sparse set of model configurations as only now taught and claimed by the instant applicants.

In addition, in Li, the set of features that the SVM is trained on is still based on individual pixels. Evan after PCA, each element in the feature vector represents individual pixel locations.

In sharp contrast, with the present invention each element on which the SVM is trained represents a fit to a whole facial feature. For example, the ith compoinent in Li's feature vector represent an edge response at a pixel (x_i, y_i). the (i+1)th component can come from anywhere in the image (PCA) takes care of the choice). In the present invention, the ith component represents the response of the facial image to a filter whose shape and location is matched to the left eyebrow, for example – a whole facial feature.

As a result, the present invention extracts features that represent the geometry (position, size and orientation) of the candidate facial features. The notion of sparsity in Li comes from an energy based dimensionality reduction (PCA), while – in the present invention and in sharp contrast – comes from the choice of candidate features (position, sizes, and orientations).

As presently amended, independent claim 1 now recites (with particularly distinguishing limitations shown in bolded typeface).

"1. A method of estimating a pose of a human head in natural scenes comprising the steps of:

generating, a sparse representation of a human face by transforming a raw facial image into sets of vectors representing fits of the face **comprising fits of whole facial features that represent the geometry (position, size and orientation) of the features,** to a random, sparse set of model configurations; **wherein the sparse representation is a collection of projections to a number of randomly generated possible configurations of the human face;**

training, the sparse representation to a set of face(s) in known poses; and

determining, a pose of a head by comparing the trained representation(s) to a facial image" (emphasis supplied)

Given this, the applicants submit that independent claim 1 – as amended – is not anticipated by the Li et al reference. Since the remaining dependent claims 3 – 5 each depends therefrom and recites further distinguishing aspects of the invention – the applicants submit that they too are not anticipated by the Li et al reference. Accordingly, the applicants respectfully request the Examiner to withdraw the rejections based upon 35 USC 102.

Conclusion

The applicants submit that all of the claims now present in the application fully comply with the provisions of 35 U.S.C. § 102 and therefore are allowable. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

Respectfully submitted,
JEFFERY J. BROSEMER
By s/Jeffery J. Brosemer/
Jeffery J. Brosemer
Reg. No. 36,096
Tel.:(732)335.5773

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. 1.8(a)

I hereby certify that this correspondence is being transmitted to the United States Patent and Trademark Office on 28 March 2008.

s/Jeffery J. Brosemer/

Signature

Jeffery J. Brosemer

Typed or printed name of person signing certificate

36,096	**(732)335-5773**
Registration Number	Telephone Number